Message

From: Grange, Gabrielle Fenix [Gabrielle.Grange@doh.hawaii.gov]
Sent: 6/25/2021 3:54:05 AM
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Subject: RE: RHMW12A Proposed Well Construction Meeting Summary - JUne16, 2021

Thanks Jeff for the follow up and detailed meeting summary,

I spoke with Don Thomas earlier today. He confirmed he was able to talk with CWRM after the meeting discussed below. They indicated general agreement with the well screen plan and understood the project would move forward. I've asked him to review your notes below and provide any feedback he has. I'll be back in touch with his response tomorrow. Happy to hear you are moving forward on this important well installation.

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HAWAII STATE DEPARTMENT OF HEALTH

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From: Johnson, Jeff <JEFF.JOHNSON@aecom.com>
Sent: Thursday, June 24, 2021 5:24 PM
To: Casey, Patrick N <patrick.n.casey@hawaii.gov>; Whittier, Robert <Robert.Whittier@doh.hawaii.gov>; Linder, Steven <linder.steven@epa.gov>; Matt Tonkin <matt@sspa.com>; TU, LYNDSEY <Tu.Lyndsey@epa.gov>; Grange, Gabrielle Fenix <Gabrielle.Grange@doh.hawaii.gov>; Shende, Anay <anay.shende@doh.hawaii.gov>; Don Thomas <dthomas@soest.hawaii.edu>; Chenet, Robert F <Robert.F.Chenet@hawaii.gov>; Imata, Ryan R <ryan.r.imata@hawaii.gov>; Fujimoto, Dayna K CIV USN NAVFAC HAWAII PEARL (USA) <dayna.fujimoto@navy.mil>; Lohr, Susan C CIV USN NAVSHIPYDIMF PEARL (USA) <susan.lohr@navy.mil>; Rossi, Caroline E CIV NAVFAC HI, EV14 <caroline.rossi@navy.mil>

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Subject: [EXTERNAL] RHMW12A Proposed Well Construction Meeting Summary - JUne16, 2021

All:

A meeting between the Navy and Hawaii Department of Health (DOH) was held on June 16, 2021 to discuss RHMW12A. A few key points followed by a more detailed summary of the meeting are provided below.

Key Points

The meeting was held to review data collected during coring and the Navy's proposed construction for RHMW12A.

- The conductivity, temperature, and depth (CTD) profile data were presented graphically and shown with the RHMW12A lithological schematic log and water level and specific conductivity measurements taken during drilling and bailing.
- RHMW12A is intended to serve as a potential sentry well between the Red Hill facility and Halawa Shaft and should be completed somewhere between -132 and -190 ft msl to assess contaminant transport.
- DOH agreed with the proposed plan for well completion but would like to talk with CWRM.

Meeting Summary

The following provides key discussion topics, explanation of data, and action items from this meeting:
Attendees were Bob Whittier (Hawaii Department of Health [DOH]), Don Thomas (DOH Subject Matter Expert), Nicole Palazzolo (United States Environmental Protection Agency Region 9), Dayna Fujimoto (Naval Facilities Engineering Systems Command [NAVFAC] Hawaii), and NAVFAC contractors Jeff Johnson, Doug Roff, and Jack Kronen (AECOM).

Discussion

- Attendees were asked not to use the "print screen" function as data shown were compiled into meeting materials quickly and still regarded as preliminary. The Navy reviewed the following materials:
  - well location map (see attachment)
  - objective for installing RHMW12A as stated in Monitoring Well Network Installation Work Plan Addendum 02, Revision 00 (August 25, 2017)
  - Hawaii Department of Land and Natural Resources (DLNR) RHMW12A Well Permit cross section
  - Temperature and specific conductivity vertical profile collected by DLNR Commission on Water Resources Management (CWRM) on June 15, 2021 combined with water level, specific conductivity and lithologic data collected by AECOM
  - bail down head and geochemical parameter data summary table
  - overnight/weekend transducer water level plots
  - video logging summary

- RHMW12A is located on the northwest side of South Halawa Valley on Halawa Correction Facility Property and adjacent to the Hawaiian Cement Quarry.
- Adjacent well RHMW12 is approximately 215 feet deep (approximately 22 ft mean sea level [msl]) and screened in the bottom 15 feet of the boring.
- RHMW12A is intended to serve as a potential sentry well and provide data on groundwater flow and chemistry as well as subsurface geology.
- The DLNR well permit cross section shows the well will be constructed with a screen interval below the bottom of the "confining layer".
- The CTD profile data were presented graphically and shown with the RHMW12A lithological schematic log and water level and specific conductivity measurements taken during drilling and bailing and showed:
  - The borehole is comprised predominantly of pahoehoe basalt - with clinker and massive a'a beds between approximately -5 to -50 ft msl and a clinker and massive a'a layer (each approximately 5-feet thick) at the bottom (approximately -182 to -192 ft msl).

- Loss of drilling water circulation was encountered at -130 ft msl.
- Elevated water level elevations up to approximately 34 ft msl were noted overnight after drilling to depths between -37 to -52 ft msl.
- The water level on June 15, 2021 was measured at approximately 17 ft msl with a total borehole depth pf approximately -192 ft msl.
- The temperature profile steadily declines from approximately 25 degrees Celsius (C) to just below 22 degrees C from the water table surface to total depth.
- The specific conductivity profile shows a decline from approximately 4500 micrograms/centimeter (us/cm) to 2700 us/cm from the water table surface to total depth, fairly steady readings of approximately 3600 to 3700 us/cm from 0 to approximately -50 ft msl and a nearly straight line and constant specific conductivity of approximately 2700 us/cm from where circulation loss occurred (-130 ft msl) to total depth.

- The Navy defined basal aquifer conditions when the following three criteria are met: 1) heads are in equilibrium with approximate basal aquifer regional heads (i.e., 17 to 18 ft msl) 2) circulation loss has occurred (note that 0-30 gallons of makeup were used per core run before circulation loss and hundreds to more than a thousand gallons were required after circulation loss 3) freshwater is encountered.
- Bail down tests conducted with casing in the hole to depths being tested showed specific conductivity decreased from > 1000 us/cm from above 17 ft msl down to -127 ft msl to < 760 us/cm at -172 and -192 ft msl (note that a final measurement obtained after CWRM completed profiling a specific conductivity of 2860 us/cm; however, it should be noted that casing had been removed from the saturated zone the day prior to allow the borehole water time to equilibrate per request of CWRM).
- The discussion primarily focused on the chemistry of the well, the source of brackish water and whether fresh basal groundwater was actually encountered. DOH noted that specific conductivity measurements at the bottom of the well may represent drilling makeup water. The Navy noted values are relatively consistent with specific conductivities measured in several monitoring wells during the 4th Quarter 2020 long-term groundwater monitoring event.
- It was noted that groundwater samples had been collected at a shallower depth and at -127 ft msl during drilling. The samples were submitted to the laboratory for major cation/anion testing as requested by DOH and to provide stable isotope analysis for DOH.
- The Navy wants to ensure that the well can potentially be used as a sentry well between the Red Hill facility and Halawa Shaft and DOH agreed that to assess contaminant transport the well should be completed somewhere between -132 and -190 ft msl.
- The Navy plans to install the well with a screen that brackets the clinker zone encountered from -182 to -187 ft msl. DOH does not understand why circulation loss occurred in pahoehoe, and the Navy noted that there were fractures observed at -130 ft msl in the pahoehoe and that preliminary results of video logging indicated potential water movement at -130 ft msl. DOH agreed with the proposed plan for well completion but would like to talk with CWRM. Don Thomas said he would follow up with CWRM following this meeting.
- The Navy will provide the CTD profile graph combined with water level, specific conductivity, lithologic data, and video observations (note that videoing was being completed during this meeting so observations could only be provided verbally and on the CTD profile); bail down head and geochemical parameter data summary table; and transducer water level curves.

<u>Completed Action Items</u>

- The Navy submitted CTD profile with lithology and video observations, bail down head and geochemical parameter data, and transducer curves to Administrative Order on Consent (AOC) Parties and CWRM on June 17, 2021 (see attachments).

<u>Remaining Action Items</u>

- DOH to have discussion with CWRM
- Complete installation of RHMW12A as soon as possible to prevent potential downward migration of brackish water to the basal aquifer.

Please advise if there are any comments.

Thank you,
Jeff J

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